

REMARKS

By this response, claims 1, 8 and 22 have been amended and claim 6 has been cancelled. Claim 30-34 have been newly added to provide additional dependent claim support. Thus, claim 1-4, 7-22 and 30-34 are pending. Support for the amendments and new claims 30-34 may be found throughout the as-filed specification. Thus, no new matter has been added. Reconsideration for the above-identified application based on the foregoing amendments and the following remarks is requested.

Applicant thanks the Examiner for considering the references cited in the Information Disclosure Statement filed on June 20, 2007, as evidenced by the signed and initialed copy of the PTO-1449 Form returned with the Office Action.

An Information Disclosure Statement was filed by Applicant on August 3, 2007. To date, however, Applicant have yet to receive a copy of the Form PTO-1449 (that accompanied this submission) signed and initialed by the Examiner indicating that cited references were considered. Accordingly, Applicant respectfully requests that the Examiner provide a signed and initialed copy of the Form PTO-1449 for this submission with the next communication from the Office.

Claims 6 and 8 were objected to because the recitation of “adapted to” allegedly does not constitute a limitation in any patentable sense. Applicant respectfully disagrees. Claim 6 has been cancelled and its features incorporated into independent claims 1 and 22. Claim 8 has been amended, merely to expedite prosecution, to recite, *inter alia*, the positioning device is configured and operable to act on one of said support plate and said ceiling plate, while the other of said support plate and said ceiling plate is arranged in a stationary manner in said load lock chamber in claim 8. Thus, Applicant respectfully requests that this objection to claims 6 and 8 be withdrawn.

Claims 1-4, 6-9 and 15-22 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Application Publication No. 2003/0082466 to del Puerto *et al.* (“del Puerto”) in view of U.S. Patent No. 6,059,507 to Adams (“Adams”). Applicant respectfully traverses this rejection for at least the reason that a *prima facie* of obviousness has not been established.

Claim 6 is cancelled without prejudice or disclaimer to the subject matter therein, thus rendering moot the rejection of claim 6.

Independent claim 1 recites a lithographic projection assembly that includes, *inter alia*, “at least one load lock constructed and arranged to transfer an object between a first environment and a second environment, an object handler comprising a handler chamber in

which said second environment prevails...and a lithographic projection apparatus comprising a projection chamber." Claim 1 also recites that the handler chamber and the projection chamber can communicate for transferring of the object between the handler chamber and the projection chamber, and that the load lock comprises a load lock chamber which is provided with at least two mutually distinct object supports, each object support comprising a support plate and being configured to individually support the object. Claim 1 further recites that the load lock chamber is provided with "a positioning device constructed and arranged to decrease the distance between one of said support plates and a ceiling plate of the load lock chamber prior to and/or during evacuation of said load lock chamber, and to increase said distance between said support plate and said ceiling plate prior to said object being removed from or delivered to said at least one of said object supports." Claim 1 also recites that "the positioning device is configured and operable to decrease a gas volume adjacent a surface of the object positioned on at least one of the object supports."

Applicant respectfully submits that a *prima facie* case of obviousness has not been established by the Examiner, because the combination of del Puerto and Adams does not disclose, teach, or render obvious all of the features of claim 1, there is no motivation or objective, reasoned basis to combine the references in the manner that the Examiner has proposed, and there is no reasonable expectation that such a combination would be successful.

Del Puerto discloses a lithography system (100) that includes two alignment load locks (104, 105), a wafer exchange chamber (106), a patterning chamber (111), and a holding load lock (114). *See* del Puerto at [0030]-[0034]. The wafers are supplied to the alignment load locks (104, 105) via a track (101). *See* del Puerto at [0030]. A robot (109) is located in the wafer exchange chamber (106) and is used to transfer wafers to from the alignment load locks (104, 105) to the patterning chamber (111). *See* del Puerto at [0031]-[0034]; FIG. 1. Del Puerto also discloses that the wafer (207) may be supported by wafer supports (204, 205, 206) and clamped on a chuck (211) within the alignment load locks (104, 105). *See* del Puerto at [0039]-[0040]; FIG. 2A. Each of the alignment load locks (104, 105) is configured to perform an alignment of the wafer that enters the alignment load lock from the track (101). *See* del Puerto at [0031], and [0039]-[0047]. The specific configurations of the alignment load locks (104, 105) are illustrated in FIGs. 2A and 2B, and are described by paragraphs [0039]-[0047] of the specification.

The Office Action concedes that del Puerto fails to disclose or teach a load lock with 1) at least two mutually distinct object supports, each object support comprising a support

plate being configured to individually support the object and 2) a positioning device constructed and arranged to decrease the distance between one of the support plates and a ceiling plate of the load lock chamber prior to and/or during evacuation of the load lock chamber, and to increase the distance between the support plate and the ceiling plate prior to the object being removed from or delivered to the at least one of the object supports. Office Action, page 4. However, there are additional features that are absent in del Puerto.

For example, the cited portions of del Puerto do not disclose or render obvious that the positioning device is configured and operable to decrease a gas volume adjacent a surface of the object positioned on at least one of the object supports. In fact, the Office Action concedes that del Puerto fails to disclose or teach these aspects. Office Action, page 5, lines 19-21.

The Office Action attempts to remedy these admitted deficiencies of del Puerto to modifying del Puerto with the teachings of Adams by alleging that it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the load lock chamber of del Puerto by including at least two mutually distinct supports, a ceiling plate, a positioning device constructed and arranged to increase and/or decrease the distance between the support plate and ceiling plate to increase the production of wafer fabrication by utilizing plurality of wafers in a shorter period of time. Office Action, page 5.

Adams teaches a substrate load lock comprising a frame and a substrate support movably mounted to the frame. *See, Abstract of Adams.* In particular, the cited portions of Adams teach a substrate processing apparatus 10, which includes a main section 12 having a substrate transport 18, a substrate processing module 14, and a substrate supply module 16. the substrate transport 18 allows for transport of substrates among modules 14 and 16. Two load locks 26, 28 are located at the front end 21 of the main section 12 and allow transport of substrates between a vacuum chamber 30, in the main section 12, and the supply module 16. The load locks 26, 28 are connected to the main section 12 and each include three chambers 34, 36, 38 divided by dividers 48, 50. The three chambers 34, 36, 38 within the load locks 26, 28 are connected by a movable support 64, which is configured to move a top plate 72, a middle plate 74 and a bottom plate 76. Of the three chambers 34, 36, 38, middle chamber 36 is configured to have a vacuum environment. The movable support 64 is configured to move a upper support section 66 and a lower support section 68 between the three chambers 34, 36, 38 by a drive motor 70. Atmospheric robot 22 is configured to transfer substrates from cassettes 24, 25 to chambers 34 and 38 and vacuum chamber robot 18 is configured to transfer substrates from cassettes 24, 25 to middle chamber 36.

It would not have been obvious to modify the load lock chamber of del Puerto by including teachings Adams. As discussed above, the load lock chamber of del Puerto is used to perform alignment of wafer by utilizing an illumination source that emits an inspection wavelength through a transparent roof of the load lock chamber. A camera is configured to image the light reflected from the wafer and back through the transparent roof to determine the alignment. *See*, paragraph [0011] of de Puerto. Thus, the illumination source needs to be able to direct the inspection wavelength onto the wafer to perform the alignment. This is in striking contrast to Adams's three chambers 34, 36, 38 housed within the load locks 26, 28 which are arranged vertically. Assuming *arguendo* that a substrate within the top chamber 34 of Adams's may be aligned by use of del Puerto's illumination source, which Applicant does not concede, a substrate in either lower chamber 36 or 38 could not be aligned since the inspection wavelength could not be directed onto a substrate in either lower chambers and the camera could not image the resulting reflected light. Even if multiple wafers were aligned within a single load lock chamber of del Puerto, there is nothing within the cited portions of del Puerto to indicate that de Puerto can handle multiple aligned wafers within a single load lock chamber. In fact, de Puerto teaches two separate load lock chambers 104, 105 to handle multiple wafers.

Thus, this alleged modification of del Puerto with Adams is not obvious since it would have changed the principle of operation of del Puerto. *See*, MPEP §2143.01. Moreover, there is no reasonable expectation of success of the alleged combination. *See*, MPEP §2143.02. Furthermore, as stated in the recent United States Supreme Court decision in *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. ___, 82 USPQ2d 1385 (2007), "Often, it will be necessary for a court to look to interrelated teachings of multiple patents...in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be explicit." *Id.* at slip opinion 14, 82 USPQ2d at 1396, citing *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness"). Here, the Examiner has only provided conclusory statements, which are insufficient to support a *prima facie* case of obviousness.

In fact, the Examiner has not cited any objective evidence of a motivation or suggestion to combine and modify del Puerto and Adams. The Examiner has merely stated that "it would have been obvious to one of ordinary skill in the art at the time the invention

was made to modify the load lock chamber of del Puerto by including at least two mutually distinct supports, a ceiling plate, a positioning device constructed and arranged to increase and/or decrease the distance between the support plate and ceiling plate in a manner described above for at least the purpose to of increasing the production of wafer fabrication by utilizing plurality of wafers in a shorter time period.” Office Action, page 5 This is not objective evidence of a motivation or suggestion to combine the references. In fact, Applicant submits that the opposite would occur since, as discussed above, del Puerto is not configured to handle multiple aligned wafers within a single load lock.

Even if del Puerto and Adams is properly combinable, which Applicant does not concede and expressly refutes, the cited portions of del Puerto and Adams, individually or in combination, do not teach the aspect of the load lock comprises a load lock chamber provided with a positioning device constructed and arranged to decrease the distance between one of said support plates and a ceiling plate of the load lock chamber prior to and/or during evacuation of said load lock chamber, and to increase said distance between said support plate and said ceiling plate prior to said object being removed from or delivered to said at least one of said object supports, as recited in claim 1.

The Office Action concedes that del Puerto does not teach this aspect. Office Action at page 4. The cited portions of Adams teach that the movable support 64 is configured to move upward such that the lower support section 68 coincides with the middle chamber 36 and upper support 66 coincides with upper chamber 34. After the moveable support 64 has completed this movement, vacuum chamber robot 18 is enabled to transfer substrates into and out of middle chamber 36 and environmental robot 22 is enabled to transfer substrates into and out of upper chamber 34. Thus, there is nothing within the cited portions of Adams to teach or suggest at least the aspect of increasing the distance between the support plate and the ceiling plate prior to the object being removed from or delivered to the at least one of the object supports, as recited in claim 1.

Moreover, the cited portions of Adams fail to teach or render obvious the aspect of the positioning device configured and operable to decrease a gas volume adjacent a surface of the object positioned on at least one of the object supports, as recited in claim 1. The Office Action alleges that Adams teaches this aspect at lines 9-11 of column 5, which states:

The top plate 72 is sized and shaped to contact and make a seal with the upper surface seal 56 when the support 64 is in a down position.

Applicant respectfully disagrees. First, the cited portions of Adams do not teach decreasing a gas volume adjacent to the surface of the object, but merely teaches that the support 65 is

configured to move the top plate 72, as well as, the middle plate 74 and the bottom plate 76 to which it is attached, vertically through chambers 34, 36 and 38. With this said, top plate 72 is not configured to support any object. Further, the substrates S are arranged between the top plate 72 and the middle plate 74 and between the middle plate 74 and the bottom plate 76. The distance between the substrates S and the top plate 72 and the middle plate 74 and between the middle plate 74 and the bottom plate 76 does not change when the substrate support 64 is moved. Thus, unlike claim 1, the gas volume adjacent a surface of the substrates S is not changed by the positioning device 64 of Adams (identified by the Office Action as the “positioning device” of claim 1).

Accordingly, Applicant respectfully submits that claim 1 and the claims that depend from claim 1, which include additional advantageous features, are patentable over del Puerto in view of Adams because a *prima facie* case of obviousness has not been made by the Examiner, and respectfully requests that the rejection to claims 1-4, 7-9 and 15-21 be withdrawn.

Independent claim 22 recites a lithographic projection assembly that includes, *inter alia*, “at least one load lock constructed and arranged to transfer an object between a first environment and a second environment; an object handler comprising a handler chamber in which said second environment prevails,... and a lithographic projection apparatus comprising a projection chamber.” Claim 22 also recites that the handler chamber and the projection chamber can communicate for transferring of objects between the handler chamber and the projection chamber, and that the load lock comprises a load lock chamber which is provided with at least two mutually distinct object supports, each object support comprising a support plate and being configured to individually support the object. Claim 22 also recites that the load lock chamber is provided with “a positioning device constructed and arranged to decrease the distance between one of said support plates and a ceiling plate of the load lock chamber prior to and/or during evacuation of said load lock chamber, and to increase said distance between said support plate and said ceiling plate prior to said object being removed from or delivered to said at least one of said object supports.” Claim 22 further recites that the object handler is integrated in the load lock, so that the handler chamber and the load lock chamber are a single unit. Claim 22 also recites that the “positioning device is configured and operable to decrease a gas volume adjacent a surface of the object positioned on at least one of the object supports.”

Applicant respectfully submits that a *prima facie* case of obviousness has not been established by the Examiner, because, as discussed above, there is no motivation to combine

the reference in the manner that the Examiner has proposed, and there is no reasonable expectation that such a combination would be successful. Moreover, the combination of del Puerto and Adams does not disclose, teach, or render obvious all of the features of claim 22.

For example, neither del Puerto nor Adams discloses, teaches, or suggests that the load lock chamber is provided with a positioning device constructed and arranged to decrease the distance between one of the support plates and a ceiling plate of the load lock chamber prior to and/or during evacuation of the load lock chamber, and to increase the distance between the support plate and the ceiling plate prior to the object being removed from or delivered to at least one of the object supports, wherein the positioning device is configured and operable to decrease a gas volume adjacent a surface of the object positioned on at least one of the object supports.

In view of the foregoing, Applicant respectfully requests that the rejection to claim 22 be withdrawn.

Claims 10-14 were rejected under 35 U.S.C. §103(a) as being unpatentable over del Puerto in view of Adams, as applied to claim 1 above, and further in view of U.S. Patent No. 5,217,507 to Fuse *et al.* ("Fuse"). Applicant respectfully traverses this rejection.

Claims 10-14 depend from and recite additional aspects of claim 1. As discussed above, the cited portions of del Puerto and Adams, taken individually or in combination, fail to disclose, teach or render obvious claim 1. Moreover, the cited portions of Fuse do not remedy the deficiencies of either del Puerto or Adams. Fuse teaches the use of wafer stockers (71, 72) that are capable of stocking a number of wafers (20) within a load lock chamber (44). *See* Fuse at column 4, lines 26-28 and FIG. 2. Although the wafer stockers may possibly be provided on the opposite side of the track (101) of del Puerto as the alignment load locks (104, 105) such that wafers may be unloaded from the wafer stockers and provided to the alignment load locks (104, 105) by the track (101), Applicant respectfully submits that one of ordinary skill in the art would not be motivated to put such a stocker within the alignment load locks (104, 105) of del Puerto. Such a combination would not allow for the alignment process to be completed within the alignment load locks (104, 105) as they are described in del Puerto. Thus, providing the wafer stockers of Fuse within the alignment load locks of del Puerto would change the principal operation of del Puerto, and there is no reasonable expectation that the presence of the wafer stockers within the alignment load lock of del Puerto would allow the alignment process described by del Puerto to be successful.

Even assuming that the combination of del Puerto and Adams can be modified as alleged in the Office Action, which Applicant does not concede and explicitly refutes, the addition of Fuse does not teach or suggest all the aspects of the claim. In particular, the cited portions of del Puerto, Adams, and Fuse, taken individually or in combination, fail at least to teach or render obvious the aspect of increasing the distance between the support plate and the ceiling plate prior to the object being removed from or delivered to the at least one of the object supports, as recited in claim 1.

In view of the foregoing, Applicants respectfully request that the rejection to claims 10-14 be withdrawn.

Claims 30-34 are newly added to define additional subject matter that is novel and non-obvious over the art of record. Claims 30-34 are patentable over the art of record at least by virtue of their dependency from claim 1 and for the additional features recited therein.

All rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited. If any point remains at issue which the Examiner feels may best be resolved through a personal or telephone interview, please contact the undersigned at the telephone number below.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

PILLSBURY WINTHROP SHAW PITTMAN LLP

EMILY T. BELL
Emily T. Bell
Reg. No. 47,418
Tel. No. 703.770.7661
Fax No. 703.770.7901

54248
Christopher W. Lie

Date: November 5, 2007
P.O. Box 10500
McLean, VA 22102
(703) 770-7900